```
      FILE 'LCA' ENTERED AT 14:36:29 ON 29 APR 2004
L1          8   S     G06F019-00/IC OR G01R033-44/IC OR G01N024-0
                8/IC OR G01N033-18/IC OR G01N033-26/IC
L2        166   S       (OIL OR BITUMEN OR HYDROCARBON OR PETROLEUM
                )(3A)(AMPLITUDE OR FRACTION OR RATIO OR PROPORTION### OR
                PERCENT#### OR PER CENT####)
L3        199   S       (OIL OR BITUMEN OR HYDROCARBON OR PETROLEUM
                )(5A)(AMPLITUDE OR FRACTION OR RATIO OR PROPORTION### OR
                PERCENT#### OR PER CENT####)
L4        255   S       (WATER OR H2O OR AQ OR AQUEOUS)(5A)(AMPLITU
                DE OR FRACTION OR RATIO OR PROPORTION### OR PERCENT#### OR PER
                CENT####)
L5        124   S     T2 OR T(1W)2 OR (TRANSVERS####(3A)(TIME OR
                RELAX###### OR T2 OR 2))
L6       1394   S     NMR OR M R OR MR OR MRI OR MAGNETIC
                RESONANCE
L7         63   S     RELAXOM######## OR RELAXATION(3A)(DETERMIN#
                ####### OR MEASUR#####)
L8         43   S     CUTOFF OR (CUT OR CUTT####)(W)OFF
L9       1394   S     L1 OR L6
L10       226   S     L5 OR (L7 OR L8)


      FILE 'TULSA, FROSTI, FSTA, HCAPLUS, WPIX, PASCAL, AGRICOLA, CABA' ENTERED
      AT 14:45:47 ON 29 APR 2004
L11    826427   S     L9
L12    253829   S     L10
L13    117233   S     L3
L14    158892   S     L4
L15     13812   S     L13 AND L14
L16       193   S     L11 AND L15
L17        41   S     L12 AND L15
L18        21   S     L16 AND L17
                D TI 1-21
                D MAX 17-19
                D ALL 1-16 20-21
L19     32080   S     TRANSVERSE(3A)(TIME OR RELAX######) OR
                SPIN SPIN
L20   1142622   S     AMPLITUD###### OR PEAK######
L21       243   S     L15 AND L20
L22         2   S     L8 AND L21
L23         1   S     L22 NOT L18
                D ALL
                D MAX
L24       193   S     L11 AND L15
L25         5   S     L8 AND L24
L26        39   S     (L19 OR L20) AND L24
L27        29   S     (L25 OR L26) NOT (L22 OR L18)
L28         6   S     L27 AND EMULS#########
                D TI 1-6
                D ALL 1-4 6
                D MAX 5
L29         3   S     L27 AND CUT
L30         2   S     L29 NOT L28
                D TI 1-2
                D ALL 1-2
L31         5   S     L16 AND DISTINGUISH########
L32         3   S     L31 NOT (L29 OR L28 OR L22 OR L18)
                D TI 1-3
                D ALL 1-3
L33      3557   S     RELAXATION SPECTRUM
L34       641   S     L15 AND (REFERENCE OR STANDARD)
L35        31   S     AMPLITUDE INDEX
L36         0   S     L33 AND L34
L37         0   S     L34 AND L35
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NPC STIC
Search
4/29/2004
Database Search
History of Results
TAF

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L38        63   S    L34 AND (INDEX OR PEAK OR AMPLITUDE OR
                      CUTOFF OR (CUT OR CUTT###)(W) OFF)
L39         3   S    L34 AND DISTINGUISH########
L40        33   S    L32 OR (L29 OR L28 OR L22 OR L18)
L41         3   S    L39 NOT L40
L42        59   S    L38 NOT L40
L43        58   S    L42 NOT L41
L44         3 DUP REM L41 (0 DUPLICATES REMOVED)
L45        56 DUP REM L43 (2 DUPLICATES REMOVED)
              D L44 TI 1-3
              D ALL 1-3
              D L45
L46        12   S    L45 AND OIL WATER
              D TI 1-12
              D ALL 1-12
L47        38   S    L45 AND INDEX
L48        42   S    L45 AND STANDARD
L49        16   S    L45 AND REFERENCE
L50        30   S    L47 AND L48
L51         9   S    L47 AND L49
L52         1   S    L50 AND L51
L53         5   S    (L47 OR L48 OR L49 OR L50 OR L51) AND (OIL
                      OR WATER)(3A) FRACTION
L54        48   S    (L47 OR L48 OR L49 OR L50 OR L51) AND (OIL
                      OR WATER)(3A) RATIO
L55         0   S    (L47 OR L48 OR L49 OR L50 OR L51) AND (OIL
                      OR WATER)(3A) PROPORTION
L56         4   S    L54 AND RELAX##########
L57        16   S    (L51 OR L52 OR L53) OR L56
L58        16 DUP REM L57 (0 DUPLICATES REMOVED)
L59        12   S    L58 NOT L46
              D TI 1-12
              D ALL 1-11
              D MAX 12
L18    ===================================================================================
ANSWER  17 OF 21   WPIX COPYRIGHT   THOMSON DERWENT on STN
AN     2002-527334 [56]    WPIX  Full-text
DNN    N2002-417444        DNC C2002-149273
TI     Determination of composition of sample containing bitumen and water by
       taking nuclear magnetic resonance spectrum of sample
       at low and high temperature, and calculating water and bitumen content
       from spectrum and differential spectrum.
DC     H01 S03
IN     ALLSOPP, K; KANTZAS, A; MARENTETTE, D; MIROTCHNIK, K
PA     (UYTE-N) UNIV TECHNOLOGIES INT INC; (ALLS-I) ALLSOPP K; (KANT-I) KANTZAS
       A; (MARE-I) MARENTETTE D; (MIRO-I) MIROTCHNIK K
CYC    2
PI     US 2002081742    A1 20020627 (200256)*      23    G01N033-26    <--
       CA 2325348       A1 20020508 (200256) EN          G01V003-14
       US 6630357       B2 20031007 (200374)             G01N024-00
ADT    US 2002081742 A1 US 2001-773505 20010202; CA 2325348 A1 CA 2000-2325348
       20001108; US 6630357 B2 US 2001-773505 20010202
PRAI   CA 2000-2325348      20001108
IC     ICM  G01N024-00; G01N033-26; G01V003-14
       ICS  G01N024-08; G01N033-22; G01N033-24; G01R033-44;
            G01V003-32
AB     US2002081742 A UPAB: 20020903
       NOVELTY - The composition of a sample containing bitumen and water is determined by
       determining the nuclear magnetic resonance relaxation time spectrum of the sample at low
       temperature (preferably 0-50 deg. C) and high temperature (preferably 50-100 deg. C),
       respectively; creating a differential spectrum; and calculating water and bitumen content from
       the spectrum and differential spectrum.
          DETAILED DESCRIPTION - Determination of composition of a sample containing bitumen or
       heavy oil and water in a porous media includes determining the nuclear magnetic resonance (
       NMR) transverse relaxation time ( T2) spectrum of the sample at low temperature (preferably 0-
       50 deg. C) and at high temperature (preferably 50-100 deg. C), respectively; creating a
       differential spectrum (where Delta A = Ah - Al, Delta A = differential amplitude, Ah =
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[handwritten annotations in right margin: "Applicants own Work of the Current Applicants ... Not Prior Art ... The 4-30-04"]

amplitude at high temperature, and Al = amplitude at low temperature); and calculating water and heavy oil or bitumen content from the spectrum and differential spectrum. Water content is calculated by summing the amplitudes of low-temperature spectrum for the T2 range (where T2 is greater than 2.5 ms but less than 3000 ms), and dividing by the amplitude index (AI) of water. Heavy oil or bitumen content is calculated by summing the amplitudes of high-temperature spectrum in T2 range (in the differential spectrum where Delta A has a negative value) and the amplitudes of differential spectrum (where Delta A has a positive value), and dividing by the AI of oil at high temperature.

An INDEPENDENT CLAIM is included for a system for carrying out the method. The system comprises respective devices to determine NMR relaxation time at low and high temperature, create differential spectrum, determine water content and determine heavy oil or bitumen content.

USE - For the quantitative determination of the composition of a sample containing bitumen or heavy oil, water and solids (e.g. sand or clay)

ADVANTAGE - The method provides accurate results quickly, without the need for specialized equipment.

Dwg.0/26

TECH   US 2002081742 A1UPTX: 20020903
TECHNOLOGY FOCUS - INSTRUMENTATION AND TESTING - Preferred Parameters: The low temperature is 20-40 (preferably 30) degreesC, and the high temperature is 70-90 (preferably 80) degreesC.
Preferred Method: The AI of heavy oil or bitumen at high temperature is determined by measuring the AI of heavy oil or bitumen sample isolated from the mixture sample.

FS   CPI EPI
FA   AB
MC   CPI: H01-B03B2; H01-D12
      EPI: S03-E07C; S03-E14F

L18   ==
ANSWER 18 OF 21   WPIX COPYRIGHT THOMSON DERWENT on STN
AN   1998-272408 [24]   WPIX Full-text
DNN   N1998-213797   DNC C1998-085149
TI   Formation producibility and water cut from NMR data for oil
      industry - involves using isolated pore model based on two bulk volume
      irreducible and free fluid index cut-off times.
DC   H01 S03
IN   BOWERS, M C
PA   (CONO) CONOCO INC
CYC   20
PI   WO 9819183   A1 19980507 (199824)* EN   23   G01V003-00
      RW: AT BE CH DE DK ES FI FR GB GR IE IT LU MC NL PT SE
      W: CA GB NO
      US 5838155   A 19981117 (199902)   G01R033-20
      NO 9902060   A 19990429 (199932)   G01V003-00
      GB 2334589   A 19990825 (199936)   G01V003-00
      GB 2334589   B 20001025 (200055)   G01V003-00
ADT   WO 9819183 A1 WO 1997-US19247 19971027; US 5838155 A US 1996-739665
      19961031; NO 9902060 A WO 1997-US19247 19971027, NO 1999-2060 19990429; GB
      2334589 A WO 1997-US19247 19971027, GB 1999-7811 19990406; GB 2334589 B WO
      1997-US19247 19971027, GB 1999-7811 19990406
FDT   GB 2334589 A Based on WO 9819183; GB 2334589 B Based on WO 9819183
PRAI US 1996-739665   19961031
IC   ICM G01R033-20; G01V003-00
      ICS G01V003-175
AB   WO   9819183 A UPAB: 19980617
      The potential producibility and the proportion of water and oil produced from hydrocarbon bearing reservoirs can be predicted using an isolated model and nuclear magnetic resonance data. The model is based on the use of two bulk volume irreducible (BVI)/free fluid index (FFI) cut-off times: one based on small pores; and the other based on large pores with a throat size that will not permit movement of fluids therefrom.
      In addition to determining the BVI and FFI cut-off based on the small pores, a second cut off time which accounts for large pores having a small throat size is determined to establish a more accurate model of producibility based on the volume of the pores associated with the immobile and mobile fluids.
      ADVANTAGE - Predicts the proportion of water and oil that will be produced from a hydrocarbon bearing formation. Dwg.0/2

FS   CPI EPI
FA   AB
MC   CPI: H01-A02A
      EPI: S03-C02F1

L18   ===
ANSWER   19 OF 21   WPIX COPYRIGHT   THOMSON DERWENT on STN
AN   1983-D9989K [12]   WPIX Full-text
DNN   N1983-052660
TI   Determination of residual oil-impregnation - by determining the linear
      time of relaxation and viscosity of residual oil whose
      ratio determines residual oil.
DC   S03
IN   KARLOVA, M V; NERETIN, V D; PETROSYAN, L G
PA   (NUCG) NUCLEAR GEOPHYS CHEM
CYC   1
PI   SU 928290   B 19820517 (198312)*   4
PRAI SU 1980-2947231   19800626
IC   G01N024-08; G01V009-00
AB   SU   928290 B UPAB: 19930925
      Method is to determine unrecovered oil-impregnation during geophysical development in a
      deposit exploitation process, in which a water-mud solution sample is taken and the relative
      percentages of water and oil in the sample are determined and, additionally, twice the time of
      linear relaxation is determined using the atomic magnetic resonance of the residual oil in the
      sample.
           A sample of the water-mud solution is taken and twice the time sf linear relaxation of
      the residual oil is determined, using its atomic magnetic resonance without electro-chemical
      processing. An additional sample is taken in an oil-emulsion or lime-mud solution. From the
      oil formation and the doubled time of the linear relaxation is determined, as before. The
      residual oil-impregnation is determined according to the measurement values of the linear
      relaxation times and the viscosity of the residual oil, by the correlation of the dependency
      of the time of linear relaxation of the oil to its viscosity. Bul.18/ 15.5.82
FS   EPI
FA   AB
MC   EPI: S03-C04; S03-E07

Relative percentages
No actual determination of water/oil fractions
No weight determination USJ
TAF 4/30/2004

L18   ===
ANSWER   3 OF 21   TULSA COPYRIGHT 2004 UTULSA on STN
AN   2000:15811   TULSA Full-text
DN   732415
TI   NMR MAGIC ANGLE SAMPLE SPINNING FOR MEASURING WATER AND HEAVY
      OIL SATURATION AND HIGH RESOLUTION RELAXOMETRY
AU   WILSON, D M; LATORRACA, G A
CS   CHEVRON RES & TECHNOL CO; CHEVRON PETROL TECHNOL CO
SO   SOC CORE ANAL INT SYMP (GOLDEN, CO, 8/1-4/1999) PROC PAP NO SCA-9923, 1999
      (12 PP; 25 REFS)
DT   Conference; Conference Article
LA   English
AB   Nuclear magnetic resonance relaxometry and/or diffusion measurements can be used to
      distinguish oil and water fractions in rocks containing low density oils because the
      relaxation rates and diffusivities of the oil and water are significantly different. However,
      when core samples contain high density oils, the oil and water relaxation rates are indistinct
      and diffusion differences too small for straightforward saturation determination.
      Additionally, high density oils can have complicated T1 and T2 distributions as well as
      relaxation time constants that are too short to measure with low field relaxometry. The
      utility of using magic angle spinning (MAS) to remove the susceptibility broadening of the
      rock matrix is shown, making possible the resolution of the proton chemical shift. MAS
      measurements are used to determine water and oil saturations in diatomite samples containing
      oils with API gravity ranging from ca 10 to 27. The MAS measurements yield determinations of
      the oil and water saturations and estimates of the aromaticity of the oil, and extend
      relaxometry by obtaining separate T1s, Carr-Purcell and Hahn-Echo T2s of oil and water. The
      relaxation parameters thus obtained are not independent of spinning, and are discussed in the
      light of the relevant theory regarding MAS and field dependence.

Teaches Away From Use; Low Field Relaxometry   TAF 4/30/2004

ANSWER 4 OF 21 TULSA COPYRIGHT 2004 UTULSA on STN
AN   1999:22571 TULSA Full-text
DN   711772
TI   EVALUATING A GEOLOGICAL FORMATION
IN   ORABY, M
PA   HALLIBURTON ENERGY SERVICE
PI   EP 908722 19990414
AI   EP   19980915
PRAI US 1997-931539 19970916
SO   **EUROPE 908,722, P 4/14/1999, F 9/15/1998, PR US 9/16/1997 (APPL 931,539)**
      (G01N-033/24; G01V-003/32) (10 PP; 13 CLAIMS)
DT   Patent
LA   English
AB   A method of nuclear magnetic resonance logging is described. The method is helpful in
      formation evaluation and assists in the control of water in a formation and in identifying pay
      zones with high irreducible (or bound) water saturation. The latter application is critical in
      determining whether an oil-containing formation will produce fluid that has a low enough
      water/oil ratio to be profitable. The method makes use of the time ($T2$) for a hydrogen nucleus
      to dephase completely. $T2$ varies from one hydrogen nucleus to another, depending on the
      location of the hydrogen in the formation. When the hydrogen is adjacent an underground rock
      surface, it comprises immovable or bound water. When this bound water is affected by the
      magnetic field of an MRI tool, the rock causes the bound water to have a shorter $T2$. In this
      way, movable water may be differentiated from immovable water, and the formations that will
      produce oil profitably can be selected.
IC   ICM G01N033-24
      ICS G01V003-32   *NA TAF 4/30/2004*
CC   WELL LOGGING

ANSWER 5 OF 21 TULSA COPYRIGHT 2004 UTULSA on STN
AN   1999:22563 TULSA Full-text
DN   711764
TI   NMR LOGS FIND RESERVES BY-PASSED BY CONVENTIONAL ANALYSIS
AU   HAMADA, G M; AL-BLEHED, M S; AL-AWAD, M N J
CS   KING SAUD UNIV
SO   **OIL GAS J V 97, NO 39, PP 75-80, 9/27/1999 (ISSN 00301388; COLOR; 13 REFS)**
DT   Journal
LA   English
AB   Nuclear magnetic resonance (NMR) technology is proving to be an essential tool for evaluating
      formations, especially low-resistivity reservoirs. By differentiating between movable and
      immovable fluids, NMR logs have helped log analysts obtain more accurate reserve estimates
      than possible from conventional resistivity log interpretation, as shown by 4 examples in this
      article. In these examples, NMR data aided in identifying a zone's producibility, determining
      lithology independent porosity, and distinguishing between bound and free water. NMR data
      interpretation, however, requires caution and experience to ensure that suitable cutoff values
      are selected and that reliable conclusions are reached from the measured and calculated
      parameters, especially in carbonate reservoirs. Along with identifying low-resistivity and
      low-resistivity-contrast reservoirs, NMR logs can also provide (1) detailed porosity
      information and thus replace conventional porosity logs as the porosity and fluid type
      identifier; (2) accurate formation permeability, especially in complex lithology formations;
      (3) quantitative information about pore fluids such as clay-bound water, capillary-bound
      water, free water, oil, and gas; and (4) predictions concerning water-free oil production, in
      cases where the resistivity log indicates high-water saturation.
CC   WELL LOGGING
SH   *NUCLEAR MAGNETIC LOGGING
CT   *FORMATION EVALUATION; *FREE FLUID INDEX; *INTERPRETATION; *
      WATER OIL RATIO; WATER   *NA TAF 4/30/2004*
      SATURATION; WELL LOG; WESTERN DESERT
RN   1333-74-0 (HYDROGEN)
      12627-13-3 (SILICATE)

ANSWER 6 OF 21 TULSA COPYRIGHT 2004 UTULSA on STN
AN   1999:21409 TULSA Full-text
DN   710610
TI   LOW-FIELD NMR DETERMINATIONS OF THE PROPERTIES OF HEAVY OILS AND

WATER-IN-OIL EMULSIONS
AU   LATORRACA, G A; DUNN, K J; WEBBER, P R; CARLSON, R M
CS   CHEVRON PETROL TECHNOL CO
DT   Conference; Conference Article
LA   English
AB   Low-field (<50 mT) nuclear magnetic resonance (NMR) well-logging measurements are beginning
      to be used to obtain estimates of oil viscosity in situ. To build an interpretive capability,
      we made laboratory T1 and T2 relaxation measurements on a suite of high-density, high-
      viscosity crude oils. These measurements were also used to estimate oil viscosity and water
      fraction from T1 and T2 measurements on stable, water-in-oil emulsions. High-density, high-
      viscosity oils have components that relax faster than can be measured by nuclear magnetic
      resonance logging tools. This requires corrections to T2 logging measurements for accurate
      estimates of oil saturation and porosity. (c1998 Elsevier Science Inc.)
CC   WELL LOGGING
SH   *NUCLEAR MAGNETIC LOGGING
CT   *CRUDE OIL; *EMULSION; *FLOW PROPERTY; *MAGNETIC FIELD; *MAGNETIC
      RESONANCE; *MAGNETISM; *MIXTURE; *NUCLEAR LOGGING; *NUCLEAR
      MAGNETIC RESONANCE; *PETROLEUM; *PHYSICAL PROPERTY;
      *RESONANCE; *SHEAR VISCOSITY; *VISCOSITY; *VISCOUS CRUDE OIL; *WATER IN
      OIL EMULSION; *WELL LOGGING; ALKALI METAL; ASPHALT; ASPHALTENE; BITUMEN;
      CHART; COMPOSITION; COMPOUND; DATA; DATA ANALYSIS; DATA PROCESSING;
      DENSITY; ELEMENT (CHEMICAL); EXPERIMENTAL DATA; GRAPH; HYDROCARBON
      COMPOUND; HYDROGEN; LABORATORY TESTING; LOGARITHM; MATHEMATICS; MICELLE;
      OIL DENSITY; OIL SATURATION; PARTICLE; PETROLEUM RESIN; POROSITY; POROSITY
      (ROCK); RELAXATION; SATURATION; SOLID HYDROCARBON; TESTING; VOLUME; WATER;
      WATER CONTENT; WELL LOGGING DATA
RN   1333-74-0   (HYDROGEN)
      8002-05-9   (CRUDE OIL)   *No Deferment of oil/water fracts.
      8002-05-9   (PETROLEUM)   *No use of weights to determine the estimated
      8052-42-4   (ASPHALT)   fracts*
                                TAF 4-30-2004

L18   ==

ANSWER 7 OF 21 TULSA COPYRIGHT 2004 UTULSA on STN
AN   1999:4087 TULSA Full-text
DN   693288
TI   ESTIMATION OF HYDROCARBON VISCOSITY WITH MULTIPLE TE (INTERECHO TIME) DUAL
      WAIT-TIME MRIL (MAGNETIC RESONANCE IMAGE LOG) LOGS
AU   CHEN, S; GEORGI, D T; MINETTO, J C; OLIMA, O; GAMIN, H
CS   WESTERN ATLAS LOGGING SERV; YAC PETROL FISC ARGENTINA
DT   Conference; Conference Article
LA   English
AB   A successful example of using multiple TE dual wait-time (TW) log acquisitions for
      quantitative characterization of San Jorge Basin reservoir oil viscosity is reported.
      Previously, dual TW logs have been used to separate gas and oil, while dual TE logs have been
      used as a qualitative light oil indicator. Although theoretically simple, quantitative
      determination of viscosity from dual TE logs is complicated by several factors, including poor
      signal-to-noise ratio, difficulties in separating oil from water, and the uncertainty of
      internal gradient strength. Multiple TE acquisitions of dual TW logs were used to isolate the
      oil from the water signal. The values of viscosity of the reservoir fluids can be estimated
      from 3 NMR properties: intrinsic T2, apparent T2, and T1. In estimation of the apparent T2, a
      model was used that does not explicitly require knowledge of the internal gradient, thereby
      minimizing the effects arising from the uncertainty of the internal and tool gradient
      strengths. Since T1 and intrinsic T2 are estimated independently, the degree of agreement
      between the 2 values provides an indication of the reliability of the 2 estimates. The method
      has been used successfully in San Jorge Basin, Argentina.
CC   WELL LOGGING
SH   *NUCLEAR MAGNETIC LOGGING
CT   *DATA PROCESSING; *FLOW PROPERTY; *FUNCTION (MATHEMATICS);
      *INTERPRETATION; *MAGNETIC RESONANCE; *MATHEMATICS;
      *NUCLEAR LOGGING; *NUCLEAR MAGNETIC RESONANCE;
      *PHYSICAL PROPERTY; *RESONANCE; *TIME FUNCTION; *VISCOSITY; *WELL LOG
      INTERPRETATION; *WELL LOGGING; AMPLITUDE; ARGENTINA; CRUDE OIL; DATA;

                                                            NA TAF
                                                            4-30-2004

DIFFUSION; FLUID PROPERTY; GRAPHICAL REPRESENTATION; IMAGING; LIGHT CRUDE
OIL; MAGNETIC PROPERTY; MATHEMATICAL ANALYSIS; MOLECULAR STRUCTURE; NOISE;
OIL PROPERTY; PERMEABILITY; PERMEABILITY (ROCK); PETROLEUM; PORE SIZE;
POROSITY; POROSITY (ROCK); POROSITY DISTRIBUTION; RESERVOIR FLUID; SAN
JORGE FM; SAN JORGE GULF BASIN; SATURATION; SATURATION (ROCK); SIGNAL
LEVEL; SIGNAL TO NOISE RATIO; SOUTH AMERICA; SPECTRAL DATA; STRUCTURE;
VISCOUS CRUDE OIL; WAVE AMPLITUDE; WELL LOGGING DATA

RN   8002-05-9   (CRUDE OIL)
          8002-05-9   (PETROLEUM)

L18   ==
ANSWER   8 OF 21   TULSA COPYRIGHT 2004 UTULSA on STN
AN   98:20249 TULSA Full-text
DN   684520
TI   FORMATION PRODUCIBILITY AND WATER CUT FROM NMR DATA USING
          ISOLATED PORE MODEL
IN   BOWERS, M C
PA   CONOCO INC
PI   19980507
AI   19971027
SO   WORLD 98/19,183, P 5/7/98, F 10/27/97, PR US 10/31/96 (APPL 739,665)
          (G01V-003/00) (23 PP; 10 CLAIMS)
DT   Patent
LA   English
AB   A method is described that predicts the percentage of water and oil that will be produced from
          a hydrocarbon-bearing formation. The method is based upon an Isolated Pore Model that uses
          more than one bulk volume irreducible (BVI)/free fluid index (FFI) cutoff time. In addition to
          determining the BVI and FFI cutoff based on small pores, a second cutoff time, which accounts
          for large pores having a small throat size, is determined in order to establish a more
          accurate model of producibility based on the volume of pores associated with the immobile
          fluids and the volume of pores associated with mobile fluids. These porosities, based on the
          Isolated Pore Model, are then used to determine the irreducible water saturation and relative
          permeability to water and oil and the percentage of hydrocarbons and water that will be
          produced.
CC   WELL LOGGING
SH   *NUCLEAR MAGNETIC LOGGING
CT   *DATA ANALYSIS; *DATA PROCESSING; *FORMATION EVALUATION; *INTERPRETATION;
          *MATHEMATICAL MODEL; *MODEL; *NUCLEAR LOGGING; *PHYSICAL PROPERTY;
          *POROSITY; *POROSITY (ROCK); *WELL LOG INTERPRETATION; *WELL LOGGING;
          CALCULATING; CAVITY; CHART; COMPUTING; CONOCO INC; DATA; DETECTION;
          DETECTOR; DETERMINING; DISTRIBUTION; EQUATION; GEOLOGIC STRUCTURE;
          INSTRUMENT; MAGNETIC RESONANCE; MATHEMATICS; NUCLEAR
          MAGNETIC RESONANCE; OIL RESERVOIR; PORE; PORE GEOMETRY;
          PORE SIZE; PORE VOLUME; REMOTE SENSING; REMOTE SENSOR; RESERVOIR;
          RESONANCE; SATURATION; SHAPE; SONDE; TABLE (DATA); VOLUME; WATER
          SATURATION; WELL LOG; WELL LOGGING DATA; WELL LOGGING EQUIPMENT

L18   ==
ANSWER   9 OF 21   TULSA COPYRIGHT 2004 UTULSA on STN
AN   97:22494 TULSA Full-text
DN   662328
TI   A NEW CHARACTERIZATION OF BULK-VOLUME IRREDUCIBLE USING MAGNETIC
          RESONANCE
AU   COATES, G R; MARSCHALL, D; MARDON, D; GALFORD, J
CS   NUMAR; NUMAR AUSTRALIA
SO   38TH ANNU SPWLA LOGGING SYMP (HOUSTON, 6/15-18/97) TRANS PAP NO QQ, 1997
          (14 PP; 16 REFS)
DT   Conference; Conference Article
LA   English
AB   Irreducible water volume from the new magnetic resonance (MR) logging tools provides the log
          analyst with insight into a formation's permeability and its water-cut potential. However, the
          traditional T2 cutoff method to determine the bulk volume of irreducible water has been found
          to be inadequate for some formations and fluid conditions. A method to characterize bulk
          volume irreducible that addresses these issues is presented. The method is based on the
          premise that each pore size has its own inherent irreducible water saturation. Given that
          relaxation time is related to pore size, this method utilizes core MR measurements to relate
          each relaxation time to a specific fraction of capillary bound water. Thus, the bulk volume

irreducible becomes a direct output of the inversion of the echo data, and it utilizes the entire T2 distribution. Core data are presented that demonstrate the Spectral Bulk Volume Irreducible (SBVI) petrophysical model and the method used for its characterization. Log examples of the SBVI implementation are presented to demonstrate the improvements brought by this development.

```
CC   WELL LOGGING
SH   *NUCLEAR MAGNETIC LOGGING
CT   *CRITICAL SATURATION; *FREE FLUID INDEX; *INTERPRETATION; *
     MAGNETIC RESONANCE; *NUCLEAR LOGGING; *NUCLEAR
     MAGNETIC RESONANCE; *PHYSICAL PROPERTY; *RESONANCE;
     WATER OIL RATIO; WATER WETTABILITY; WAVE
     AMPLITUDE; WELL LOGGING DATA; WETTABILITY
RN   1317-65-3  (LIMESTONE)
     1333-74-0  (HYDROGEN)
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No Actual Determinates Made

NA TMF 4-30-2004

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AN   2000:901885  HCAPLUS Full-text
DN   134:73721
ED   Entered STN:  24 Dec 2000
TI   Estimation of hydrocarbon viscosity with multiple-te, dual-tw
     magnetic resonance image logs
AU   Chen, Songhua; Georgi, D. T.; Olima, Oscar; Gamin, Hector; Minetto, J. C.
CS   Western Atlas Logging Services, USA
SO   SPE Reservoir Evaluation & Engineering (2000), 3(6), 498-508
     CODEN: SREEFG; ISSN: 1094-6470
PB   Society of Petroleum Engineers
DT   Journal
LA   English
CC   51-1 (Fossil Fuels, Derivatives, and Related Products)
AB   We report a case study of using NMR multiple-te, dual wait-time (tw) log acquisitions for
     quant. characterization of San Jorge Basin reservoir oil viscosity.  Previously, dual-tw logs
     have been used to discern gas and oil from water, while dual-te logs have been used as a qual.
     light oil indicator.  Although theor. simple, quant. determination of viscosity from dual-te
     logs is complicated by several factors, including poor signal-to-noise ratio, difficulties in
     separating oil from water, and the uncertainty of internal gradient strength. In the present
     study, multiple-te acquisitions of dual-tw logs were used to isolate the oil from the water
     signal.  The values of viscosity of the reservoir fluids can be estimated from either
     intrinsic T2 or T1. In estimation of the apparent T2, we used a model that does not explicitly
     require knowledge of the internal gradient, thereby minimizing the effects arising from the
     uncertainty of the internal and tool gradient strengths.  Because T1 and intrinsic T2 are
     estimated independently, the degree of agreement between the two values provides an indication
     of the reliability of the two ests.  The main example in the study of four pay zones contain
     viscous oil.  However, our anal. indicated that the viscosity values of the oil are less than
     5 cP.  The predictions have been substantiated by production of light hydrocarbons from the
     three zones that have been perforated.  Further, a good agreement is obtained for the
     viscosity ests. based on NMR log data and laboratory pressure/volume/temperature (PVT) anal.
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AN   1998:730311  HCAPLUS Full-text
DN   130:54539
ED   Entered STN:  18 Nov 1998
TI   Low-field NMR determinations of the properties of heavy oils and
     water-in-oil emulsions
AU   Latorraca, G. A.; Dunn, K. J.; Webber, P. R.; Carlson, R. M.
CS   Chevron Petroleum Technology Co., La Habra, CA, 90631, USA
SO   Magnetic Resonance Imaging (1998), 16(5/6), 659-662
     CODEN: MRIMDQ; ISSN: 0730-725X
PB   Elsevier Science Inc.
DT   Journal
LA   English
CC   51-3 (Fossil Fuels, Derivatives, and Related Products)
AB   Low-field (<50 mT) NMR well-logging measurements are beginning to be used to obtain ests. of
     oil viscosity in situ.  To build an interpretive capability, we made laboratory T1 and T2
```

relaxation measurements on a suite of high-d., high-viscosity crude oils. These measurements were also used to estimate oil viscosity and water fraction from T1 and T2 measurements on stable, water-in-oil emulsions. High-d., high-viscosity oils have components that relax faster than can be measured by NMR logging tools. This requires corrections to T2 logging measurements for accurate ests. of oil saturation and porosity.

No Actual oil/water Frack deKlambe 4/30/2004

L18 ==

ANSWER 14 OF 21 HCAPLUS COPYRIGHT 2004 ACS on STN
AN   1994:466303 HCAPLUS Full-text
DN   121:66303
ED   Entered STN: 06 Aug 1994
TI   Cryo-TEM and NMR Studies of Solution Microstructures of
      Double-Tailed Surfactant Systems: Didodecyldimethylammonium Hydroxide,
      Acetate, and Sulfate
AU   Regev, Oren; Kang, Changjiang; Khan, Ali
CS   Chemical Centre, University of Lund, Lund, S-221 00, Swed.
SO   Journal of Physical Chemistry (1994), 98(26), 6619-25
      CODEN: JPCHAX; ISSN: 0022-3654
DT   Journal
LA   English
CC   66-1 (Surface Chemistry and Colloids)
AB   Didodecyldimethylammonium hydroxide (DDAOH) and acetate (DDAAc) are easily soluble in water,
      forming isotropic solution phases (0-30 wt % DDAOH and 0-32 wt % DDAAc), whereas
      didodecyldimethylammonium sulfate (DDAS) is sparingly soluble ($\approx$0.2 wt %) in water. All three
      surfactants form lamellar phases in water at high surfactant concns. Addition of dodecane to
      the lamellar dispersions of DDAS yields anisotropic solution phase in the water-rich part of
      the triangle. Cryo-TEM, NMR self-diffusion, and 1H NMR transverse relaxation techniques have
      been employed to study aggregate structures in solns. for these surfactant systems. Cryo-TEM
      micrographs detect stable vesicles, and for solutions with OH- and CH3COO- counterions,
      vesicles coexist with normal micelles within certain concentration ranges above which micelles
      are the only stable aggregates. Concentration-dependent self-diffusion coeffs. measured by
      the PGSE NMR method show that the surfactant ions have a minimum in their self-diffusion
      coeffs. with both OH- and CH3COO- ions. Moreover, there is micellar growth in the dilute part
      of the solution regions. Mol. diffusion, i.e., the exchange of monomers between aggregates,
      becomes important in concentrated solns. In the ternary solution with SO42- as a counterion,
      near spherical oil-in-water-type droplets are formed at very high water contents, and with a
      decreasing water concentration at a constant molar ratio between oil and surfactant, a
      moderate swelling of the droplets with oil is observed At low molar ratios between oil and
      surfactant and low water contents, the exchange of monomers between aggregates dominates the
      surfactant diffusion process.

NA TAF 4/30/2004

L18 ==

ANSWER 15 OF 21 HCAPLUS COPYRIGHT 2004 ACS on STN
AN   1993:232496 HCAPLUS Full-text
DN   118:232496
ED   Entered STN: 12 Jun 1993
TI   Measurement of oil in French dressing by medium-resolution, proton-
      magnetic-resonance spectroscopy
AU   Fairbrother, P.; Rutledge, D. N.
CS   Lab. Chim. Anal., Inst. Natl. Agron., Paris, 75231, Fr.
SO   Analusis (1993), 21(2), 113-17
      CODEN: ANLSCY; ISSN: 0365-4877
DT   Journal
LA   English
CC   17-1 (Food and Feed Chemistry)
AB   A medium-resolution (20 MHz) NMR spectrometer has been used to measure the oil content of
      French dressing. The amount of sample employed and the position of the sample in the magnetic
      field were studied to maximize signal intensity without loss of resolution Anhydrous CuSO4
      was added to the dressing (1% weight/weight) to relax the large water resonance and enhance
      detection of the much weaker oil resonance. A calibration graph relating the area ratios of
      the oil and water peaks to the concentration of oil was constructed. This procedure enables
      the oil levels of such food emulsions to be determined simply and quickly.
IT   Fats and Glyceridic oils
      RL: ANT (Analyte); ANST (Analytical study)
      (determination of, in French dressing by medium-resolution NMR
      spectroscopy)

Not 2 MHz on here

NA TAF 4/30/2004

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IT    Sunflower oil
      RL: ANT (Analyte); ANST (Analytical study)
          (determination of, in food emulsions by medium-resolution NMR
          spectroscopy)
IT    Food analysis
          (oil determination in, of emulsions by medium-resolution NMR
          spectroscopy)
IT    Salad dressings
          (French, oil determination in, by medium-resolution NMR spectrometry)
IT    7758-98-7, Cupric sulfate, properties
      RL: PRP (Properties)
          (water resonance relaxation with, in oil determination in
          French dressing by NMR spectrometry)


L18   =================================================================================
ANSWER  16 OF 21   HCAPLUS   COPYRIGHT 2004 ACS on STN
AN    1979:525882   HCAPLUS Full-text
DN    91:125882
ED    Entered STN:  12 May 1984
TI    NMR-relaxometric determination of water and petroleum
      content in water- and petroleum-saturated rock samples
IN    Belorai, Yu. L.; Zaporozhets, M. V.; Karpova, M. V.; Neretin, V. D.;
      Petrosyan, L. G.; Shimelevich, Yu. S.; Yudin, V. A.
PA    All-Union Scientific-Research Institute of Nuclear Geophysics and
      Geochemistry, USSR
SO    U.S.S.R.
      From: Otkrytiya, Izobret., Prom. Obraztsy, Tovarnye Znaki 1979, (17), 155.
      CODEN: URXXAF
DT    Patent
LA    Russian
IC    G01N027-28
CC    51-2 (Fossil Fuels, Derivatives, and Related Products)
      Section cross-reference(s): 61
FAN.CNT 1
      PATENT NO.        KIND  DATE        APPLICATION NO.  DATE
      ---------------   ----  --------    ---------------  --------
PI    SU 661320          T    19790505    SU 1976-2423118  19761126
PRAI  SU 1976-2423118         19761126
AB    The process consists of measuring the total content of a liquid in a sample by comparing the
      signal amplitude from the sample with the signal amplitude of the standard upon their
      successive addition to a relaxometer sensor and determining the ratio of water and petroleum
      phases by recording and analyzing the proton relaxation curve.  After recording the 1st
      relaxation curve, paramagnetic ions, which are selectively soluble in 1 of the liqs.
      saturating the sample, were added to the pore space of the sample, the repeated relaxation
      curve was compressed and from its comparison with the initial curve the water phase was
      uniquely determined as a relaxation curve corresponding to the component, the relaxation time
      of which was reduced after addition of paramagnetic ions.  Paramagnetic ions were added by
      placing the rock sample in a solution containing Co2+, Fe3+, Cr3+, and Cu2+ and a current was
      passed through the sample by means of electrodes (made of a material which forms paramagnetic
      ions during dissoln.) which were immersed in the solution
ST    water detn rock NMR; petroleum detn rock NMR;
      NMR petroleum water detn
IT    Petroleum
      RL: ANT (Analyte); ANST (Analytical study)
          (determination of, in petroleum-saturated rocks, by NMR
          relaxometry )
IT    Magnetic relaxation
          (in petroleum and water determination in rocks by NMR)
IT    Rocks
      RL: USES (Uses)
          (petroleum and water determination in, by NMR relaxometry)
IT    7732-18-5, analysis
      RL: ANT (Analyte); ANST (Analytical study)
          (determination of, in water-saturated rocks, by NMR relaxometry)


L18   =================================================================================
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No Dist Mersmnt

NA 4/30/2004

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of America. It contains copyrighted materials. All rights reserved.
(2004) on STN

AN   94:41448 AGRICOLA Full-text
DN   IND20395759
TI   Maturity evaluation of avocados by NMR methods.
AU   Chen, P.; McCarthy, M.J.; Kauten, R.; Sarig, Y.; Han, S.
AV   DNAL (58.8 J82)
SO   Journal of agricultural engineering research, July 1993. Vol. 55, No. 3.
      p. 177-187
      Publisher: London ; Orlando : Academic Press, 1956-
      CODEN: JAERA2; ISSN: 0021-8634
NTE   Includes references
CY   England; United Kingdom
DT   Article
FS   Non-U.S. Imprint other than FAO
LA   English
AB   Nuclear magnetic resonance (NMR) experiments were conducted to find desirable methods for
      maturity evaluation of avocado fruits. NMR image intensity, the ratio of the oil and water
      resonance peaks of the one-dimensional NMR spectrum, and both the spin-lattice relaxation
      time (T1) and spin-spin relaxation time (T2) of water in the fruit were found to correlate
      with maturity of the fruit. The technique of using a surface-coil NMR probe to obtain the
      oil/water resonance peak ratio of the signal from a region of an intact fruit produced the
      best result and has desirable features for high-speed sorting.
CC   N200 Farm and Structural Equipment
CT   avocados; correlated traits; evaluation; fruit; high speed operation;
      imagery; maturity; mechanical methods; nuclear magnetic
      resonance; sensors; sorting

Not A fluid Emulsion NA TAF 4/30/2004

L28   ==
ANSWER 3 OF 6 TULSA COPYRIGHT 2004 UTULSA on STN
AN   86:16684 TULSA Full-text
DN   410178
TI   MICROSTRUCTURE OF MICROEMULSIONS OF THE SYSTEM H2O- N-TETRADECANE-C12E5
AU   LICHTERFELD, F; SCHMELING, T; STREY, R
CS   MAX PLANCK INST
SO   J PHYS CHEM V 90, NO 22, PP 5762-5766, 10/23/86 (ISSN 00223654; 47 REFS)
DT   Journal
LA   English
AB   This paper presents small-angle X-ray spectra of the homogeneous and the lamellar phase in the
      system H2O-n- tetradecane-C12E5, measured along well-defined paths through the phase prism.
      The investigations are based on the features of the phase behavior of such systems reported
      earlier. The variation of the single sharp peak in the lamellar phase with composition is
      typical for one- dimensional swelling. For homogeneous microemulsions adjacent to the body of
      heterogeneous phases, a single broad scattering maximum was found, the position and intensity
      of which varies systematically with composition. The variation of the corresponding Bragg
      spacing is found to be inconsistent with a layered, lamellar-like structure. NMR-self-
      diffusion work on the same system ruled out closed droplet structures at comparable water and
      oil volume fractions; instead, bicontinuity was established. The results are consistent with a
      disordered bicontinuous interspersion of water- and oil-rich domains with practically all
      amphiphile concentrated at the well-defined internal interface.
CC   RESERVOIR ENG. & RECOVERY METHODS
SH   *MICROEMULSION
CT   *EMULSION; *MICROSTRUCTURE; *MIXTURE; *MODEL; *MOLECULAR MODEL;
      *MOLECULAR STRUCTURE; *PHASE BEHAVIOR; *STRUCTURE; ADDITIVE; ANALYTICAL
      METHOD; AREA; CHART; COMPOSITION; DATA; DEFLECTION; DIAGRAM; DROP; ETHER;
      EXPERIMENTAL DATA; FILM; GLYCOL ETHER; GRAPH; INTENSITY; INTERFACE; LAYER;
      LIGHT SCATTERING; MAGNETIC RESONANCE; MULTICOMPONENT
      MIXTURE; NUCLEAR MAGNETIC RESONANCE; PHASE DIAGRAM;
      RESONANCE; SCATTERING; SPACING; SPECIFIC SURFACE; SPECTRAL ANALYSIS;
      SURFACE ACTIVE AGENT; SURFACE AREA; TERNARY MIXTURE; TESTING; TETRADECANE;
      WATER; WATER OIL RATIO; X RAY SPECTROSCOPY
RN   629-59-4 (TETRADECANE)

No Fluid Emuln NA TAF 4/30/2004

AN   1999-0048607 PASCAL Full-text
CP   Copyright .COPYRGT. 1999 INIST-CNRS. All rights reserved.
TIEN   **Low-field NMR determinations of the properties of heavy oils and water-in-oil emulsions**
AU   LATORRACA G. A.; DUNN K. J.; WEBBER P. R.; CARLSON R. M.
        BORGIA Giulio C. (ed.); FANTAZZINI Paola (ed.); GORE J. C. (ed.); STRANGE
        John H. (ed.)
SO   **Magnetic resonance imaging, (1998), 16(5-6), 659-662, 5 refs.**
        Conference: 4 International Meeting on Recent Advances in MR Applications
        to Porous Media, Trondheim (Norway), 31 Aug 1997
        ISSN: 0730-725X CODEN: MRIMDQ
DT   Journal; Conference; Short communication
BL   Analytic
CY   United States
LA   English
AV   INIST-19716, 354000070658410450
AB   Low-field (<50 mT) nuclear magnetic resonance (NMR) well-logging measurements are beginning
        to be used to obtain estimates of oil viscosity in situ. To build an interpretive capability,
        we made laboratory $T.sub.1$ and $T.sub.2$ relaxation measurements on a suite of high-density,
        high-viscosity crude oils. These measurements were also used to estimate oil viscosity and
        water fraction from $T.sub.1$ and $T.sub.2$ measurements on stable, water-in-oil emulsions. High-
        density, high-viscosity oils have components that relax faster than can be measured by
        nuclear magnetic resonance logging tools. This requires corrections to $T.sub.2$ logging
        measurements for accurate estimates of oil saturation and porosity.
CT   Water oil emulsion; Low field; Heavy oil; Nuclear magnetic resonance imaging; Viscosity; In
situ; Spin spin relaxation; Spin lattice relaxation; Porosity; Accuracy; Saturation

No Actd Watr/oil Reclamter / Facts Only Estimate - NA TAF 4/30/2004

AN   1999-429462 [36] WPIX Full-text
DNC   C1999-126485
TI   Treatment of heavy hydrocarbon oil feed to reduce total acid number and
        increase API gravity.
DC   H01 H04
IN   CASPARY, M T; DECANIO, S J; SUDHAKAR, C
PA   (TEXC) TEXACO DEV CORP; (TEXC) TEXACO INC
CYC   3
PI   US 5928501   A 19990727 (199936)*   8   C10G017-00
        CN 1229834   A 19990929 (200003)   C10G045-04
        CA 2260649   A1 19990803 (200004) EN   C10G045-66
ADT   US 5928501 A US 1998-17587 19980203; CN 1229834 A CN 1999-100898 19990203;
        CA 2260649 A1 CA 1999-2260649 19990202
PRAI   US 1998-17587   19980203
IC   ICM C10G017-00; C10G045-04; C10G045-66
        ICS B01J023-85; B01J037-28
AB   US   5928501 A UPAB: 19990908
        NOVELTY - Treatment of a heavy hydrocarbon oil feed comprises:
            (a) Forming a slurry which includes a heavy hydrocarbon oil and a catalytically effective
        amount of a catalyst composition comprising a non-Nobel metal of Group VIII of the periodic
        table and a metal of Group VIB of the periodic table on a phosphorus-treated carbon support;
            (b) Introducing the slurry into a reaction zone in the presence of hydrogen; and
            (c) Subjecting the slurry to acid number reducing conditions to provide a hydrocarbon oil
        product having an improved API gravity.
            USE - The process treats a hydrocarbon oil feed to reduce total acid number (TAN) and
        increase API gravity (claimed). It provides a method for upgrading a heavy oil feedstock by
        catalyst assisted hydrotreatment.
            ADVANTAGE - Deposit formation is minimized or avoided. Dwg.0/1
TECH   US 5928501 A   UPTX: 19990908
        TECHNOLOGY FOCUS - CHEMICAL ENGINEERING - Preferred catalyst: The catalyst
        includes 0.1-15 wt % of at least one metal selected from iron, cobalt and

NA TAF 4/30/2004

nickel, and from 1-50 wt % of at least one metal selected from chromium, molybdenum and tungsten and the phosphorus-treated carbon support is characterized by:
(1) having been prepared by heat treating mixtures of activated carbon and phosphorus compounds at temperatures greater than 450degreesC;
(2) the phosphorus existing in the phosphorus treated carbon being bound to the carbon surface predominantly as polyphosphate species characterized by peaks between -5 and -30 ppm in the solid-state magic angle spinning 31P NMR spectrum; and
(3) having a B.E.T. surface area of 100 - 2000 m2/g, a total pore volume for nitrogen of at least 0.3 ml/g and an average pore diameter of 12-100 A. The hydrocarbon oil feed comprises an oil selected from whole crude oil, dewatered crude oil, desalted crude oil, topped crude oil, deasphalted oil, vacuum gas oil, petroleum residua, water emulsion of crude oil, water emulsions of heavy fractions of crude oils, oil from coal liquefaction, shale oil and tar sand oil. The hydrocarbon oil feed has no measurable total acid number and an API gravity of no more than 25degrees. The slurry is a uniform suspension of the catalyst in the hydrocarbon oil feed. The process further includes the step of separating out the catalyst from the hydrocarbon oil product and recycling the separated catalyst, with or without regeneration, to the hydrocarbon oil feed. The acid number of the hydrocarbon oil product is less than 50 % that of the hydrocarbon oil feed. The API gravity of the hydrocarbon oil product is at least about 1 degree higher than that of the hydrocarbon oil feed. The acid number reducing conditions include a reaction temperature of 250-500degreesC, a pressure of 200 psig-1500 psig, a liquid hourly space velocity of 0.1-5.0 and a hydrogen feed rate of 100-10000 SCFB. The reaction temperature is 380-450degreesC and the reaction pressure is 200-1,000 psig. The catalyst concentration in the slurry is 0.01-10 wt %. The catalyst is used with or without presulfiding. The catalyst is sulfided in situ by adding a decomposable sulfur compound to the hydrocarbon oil feed before passing the slurry into the reaction zone. A portion of hydrogen sulfide generated in the process is recycled back into the process. The catalyst contains 1-20 wt % of at least one metal selected from chromium or molybdenum. The catalyst may contain 1-50 wt % tungsten. The catalyst may contain 2-12 wt % nickel, 10-45 wt % tungsten, and the carbon support contains 2.5-10 wt % phosphorus. The catalyst includes 0.01-4 wt % of a promoter selected from boron and fluorine. The process further includes the step of heat soaking the hydrocarbon oil product. The hydrogen used is of at least 60 % purity.

ABEX US 5928501 A   UPTX: 19990908
EXAMPLE - A crude oil was provided having API gravity of 15degrees. A stainless steel tubular reactor was provided. The tube had no internal structures. The internal volume of the reactor in the heated zone was 120 cc. Prior to running the experiment the weight of the reactor tube was determined. A carbon supported Ni-W catalyst containing 37 % W and 7.5 % Ni was provided. The carbon support of the catalyst contained 5 % phosphorus. The catalyst was finely ground and the fraction passing through a 400 mesh screen was thoroughly blended with the crude oil in a high speed blender, 7.5 g of catalyst being added to 3,000 g of crude oil to form a reactor feed slurry. No sulfiding agent was added. The slurry was fed into the reactor at 140 g/hour with a hydrogen flow of 600 cc/min. The reactor temperature was programmed to increase gradually to a predetermined reaction temperature of 417degreesC, in about 60 minutes and remain constant thereafter. The time when the temperature reached the predetermined reaction temperature was taken as the starting time of the reaction. The total pressure was then adjusted to the desired pressure of 400 psig. Liquid product samples were collected at various reaction times on stream at one hour intervals and were degassed with the help of an ultrasonic bath before they were analyzed for their sulfur, carbon, hydrogen and nitrogen contents. The sulfur content of the feed and product samples were determined by x-ray fluorescence spectroscopy and other analysis were carried out. At the end of the run, light petroleum naphtha was pumped through the reactor at 400 cc/hour while the reactor cooled down to remove all remaining crude oil. The naphtha was then removed from the reactor by applying vacuum. The vacuum was then weighed again, the difference between the final weight and the initial weight indicating the increase in weight attributable to deposits formed on the interior walls of the reactor. From product analysis: API gravity increase = 3.5degrees; sulfur reduction = 9 %; TAN reduction = 50 %; pitch conversion = 12 %; 50 % boiling point = 390degreesC; and reactor weight gain = negligible.

L30 ==

AN   91:9501   TULSA Full-text
DN   503900
TI   NET PAY APPLICATION FOR NUCLEAR MAGNETIC RESONANCE,
       NUGGET SANDSTONE, WYOMING THRUST BELT
AU   SERCOMBE, W J; ANDERSON, B R
CS   AMOCO PRODUCTION CO
SO   4TH ANNU SOC CORE ANAL TECH CONF (DALLAS, 8/14-16/90) PREPRINTS V 2, PAP
       NO SCA-9026, 1990 (23 PP; 7 REFS)
DT   Conference; Conference Article
LA   English
AB   Nuclear magnetic resonance (NMR) test results from the Jurassic Nugget Sandstone in the
       Wyoming thrust belt were combined with other core tests to develop net pay criteria that would
       reflect **water** cut and deliverability in addition to hydrocarbon pore volume. The producing
       characteristics of the Nugget Sandstone had previously been correlated to eolian dune facies
       in the first several years of thrust belt exploration. Inconsistencies in facies-to-pay
       correlations from new discoveries and longer production histories required a new method to
       evaluate net pay that would evaluate the impact of connate water saturation on reservoir
       behavior. This NMR pay method approach integrates relative permeability, capillary pressure,
       and NMR test evaluations and resultant estimates of reservoir behavior affected by connate
       water saturation. These tests quantify fractional flow, pore throat size, and relative
       permeability for any selected water saturation value.
CC   RESERVOIR ENG. & RECOVERY METHODS
SH   *NET PAY VOLUME
CT   *CAPACITY (ROCK); *FORMATION THICKNESS; *GAS WELL CAPACITY; *
       MAGNETIC RESONANCE; *NUCLEAR MAGNETIC
       RESONANCE; *NUGGET SANDSTONE; *PHYSICAL PROPERTY; *PRODUCING
       CAPACITY; *RESERVOIR ZONATION; *RESONANCE; *ROCK PROPERTY; *THICKNESS;
       *VOLUME; *ZONATION; AMPLITUDE; ANALYTICAL METHOD; ANSCHUTZ RANCH
       E GAS CON F; BASE MAP; CAPILLARITY; CAPILLARY PHENOMENON; CAPILLARY CONTACT; GAS WATER RATIO;

NO Actual Measurmt

NA TAF 4/30/2004

L30   ==
AN   1999-0124724   PASCAL Full-text
TIEN   Estimation of hydrocarbon viscosity with multiple TE dual wait-time MRIL
       logs
       **Formation evaluation and reservoir geology : New Orleans LA, 27-30
       September 1998**
AU   SONGHUA CHEN; OLIMA O.; GAMIN H.; GEORGI D. T.; MINETTO J. C.
CS   Western Atlas Logging Services, Houston, TX, United States; YPF S.A.,
       Comodoro Rivadavia, Argentina; Western Atlas Logging Services, Comodoro
       Rivadavia, Argentina
       Society of Petroleum Engineers, Richardson TX, United States (patr.)
SO   (1998), 213-226, 8 refs.
       Conference: SPE annual technical conference, New Orleans LA (United
       States), 27 Sep 1998
       Published by: SPE, Richardson TX
DT   Conference
BL   Analytic
CY   United States
LA   English
AV   INIST-IFPC1164, 354000073166320170
AB   In this paper, we report a successful example of using multiple TE dual wait-time (TW) log
       acquisitions for quantitative characterization of San Jorge Basin reservoir oil viscosity.
       Previously, dual TW logs have been used to separate gas and oil, while dual TE logs have been
       used as a qualitative light oil indicator. Although theoretically simple, quantitative
       determination of viscosity from dual TE logs is complicated by several factors, including
       poor signal-to-noise ratio, difficulties in **separating** oil **from water**, and the uncertainty of
       internal gradient strength. We used multiple TE acquisitions of dual TW logs to isolate the
       oil from the water signal. The values of viscosity of the reservoir fluids can be estimated
       from three NMR properties: intrinsic T_2, apparent T_2, and T_1. All three
       approaches have advantages and disadvantages. Since T_1 estimates are not affected by
       diffusion, the uncertainty in the internal field gradient has no effect on T_1-based
       viscosity. However, T_1 is difficult to estimate because it relies on small differences
       in the dual TW echo data. In estimation of the apparent T_2, we used a model that does

not explicitly require knowledge of the internal gradient, thereby minimizing the effects arising from the uncertainty of the internal and tool gradient strengths. Since T.sub.1 and intrinsic T.sub.2 are estimated independently, the degree of agreement between the two values provides an indication of the reliability of the two estimates. The method has been used successfully in San Jorge Basin, Argentina. Three values of TE, 1.2, 2.4, and 3.6 ms were used and a dual TW log was acquired for each TE. The data were analyzed without need for other geological information or log data from other logging tools. To complicate the matter, previous NMR core analysis of the core plugs cut from another well in San Jorge Basin showed great porosity and permeability variations. Furthermore, no reliable reservoir fluid measurements were available. Thus, interpretation was based only on the NMR log data. The four zones selected for this study were thought to contain heavy, viscous oil. However, our analysis indicated that the viscosity values of the oil are less than 5 cP. Our predictions have been substantiated by production of light hydrocarbons from the three zones that have been perforated. Further, viscosity measurements on the reservoir fluid from one of the three zones is 2.6 cP, which is in good agreement with the NMR -derived estimate of 3.3 cP.

CC   001D06B02B2B; Applied sciences; Energy; Fuels
      230; Energy
CT   NMR logging; Nuclear magnetic resonance
      imaging; Petroleum; Viscosity; Echo time; Data processing; Computing
      method; Spin spin relaxation; Theoretical study

NA TAF 4/30/2004 (handwritten)

L32   ==
ANSWER 1 OF 3   TULSA COPYRIGHT 2004 UTULSA on STN
AN   97:3726   TULSA Full-text
DN   643560
TI   METHOD AND APPARATUS FOR DETERMINING FLOW RATES IN MULTI-PHASE FLUID FLOW
      MIXTURES
IN   CARLSON, N R; DAVARZANI, M J
PA   WESTERN ATLAS INTERNAT INC
PI   **US 5586027 19961217**
AI   US   19951113
PRAI US 1989-364889 19890612
PRAI US 1991-697538 19910430
PRAI US 1992-963000 19921019
PRAI US 1993-90480 19930712
PRAI US 1994-213457 19940314
PRAI US 1995-384603 19950203
SO   US 5,586,027, C 12/17/96, F 11/13/95, PR US 6/12/89 (APPL 364,889), US
      4/30/91 (APPL 697,538), US 10/19/92 (APPL 963,000), US 7/12/93 (APPL
      90,480), US 3/14/94 (APPL 213,457) AND US 2/3/95 (APPL 384,603)
      (G06F-019/00; E21B-047/00) (14 PP; 4 CLAIMS)
DT   Patent
LA   English
AB   A method and an apparatus are described for determining the water cut of an oil-water flow in
      a well bore having a known deviation angle less than 90(deg). A first step includes generating
      a set of predicted response curves related to measured responses of a selected logging
      instrument capable of distinguishing between the water and oil phases of the flow mixture for
      a selected oil-water total flow rate and at a borehole deviation within a selected range of
      deviation values that include the known borehole deviation. Then the selected logging
      instrument combination is introduced into the borehole for measuring the total flow rate of
      the oil-water mixture and the values representative of the responses of the selected logging
      instrument distinguishing **between the oil and water phases of the oil-water mixture.** A value
      functionally related to the measured value representative of the responses of the selected
      logging instrument is generated. From the set of predicted response curves, an estimated value
      of the water cut of the oil-water mixture at the measured borehole total flow rate of the oil-
      water mixture is determined in response to the generated value functionally related to the
      measured value representative of the responses of the selected logging tool.
IC   ICM G06F019-00
      ICS E21B047-00

No Actual Water/oil Fracks Deferred only Estimates (handwritten)

CC   WELL LOGGING
SH   *FLUID ENTRY PROFILING
CT   *COMPOSITION; *DIRECTIONAL WELL; *FLOW MEASURING; *FLUID ENTRY;
      *MEASURING; *PRODUCTION LOGGING; *PROFILING; *TESTING; *WATER
      OIL RATIO; *WELL; *WELL LOGGING; ALGORITHM;

TAF 4/30/2004 (handwritten)

AN   89:6079 TULSA Full-text
DN   458342
TI   MICROEMULSIONS WITH NONIONIC SURFACTANTS : PT.1 : DIFFUSION PROCESS OF OIL
      MOLECULES
AU   OLSSON, U; WENNERSTROM, H; NAGAI, K
CS   LUND UNIV; NAGASAKI UNIV
SO   J PHYS CHEM V 92, NO 23, PP 6675-6679, 11/17/88 (ISSN 00223654; 31 REFS)
DT   Journal
LA   English
AB   The molecular self-diffusion in a microemulsion system composed of 7.0% by wt pentaethylene
      glycol dodecyl ether, water, and a 1:1 by wt mixture of cyclohexane and hexadecane was
      investigated by using the Fourier transform pulsed-gradient spin-echo 1H NMR technique. The
      purpose of the mixing of 2 oils was to reveal information concerning the diffusion processes
      responsible for the observed macroscopic transport of oil molecules in microemulsion systems.
      The study was performed in an isotropic solution phase that at a constant surfactant
      concentration of 7.0% (w/w) exists over the whole range of water-to-oil ratios. For the
      majority of compositions the dominating diffusion process is a molecular diffusion in an oil
      medium. This process is at low oil content achieved by rapid fusion- fission of micellar
      aggregates, and a significant polydispersity is suggested to explain the magnitude of the
      diffusion coefficients. The present study also distinguishes at low temperature and oil
      content, the presence of closed swollen micelles (O/W microemulsion) where the dominating
      diffusion process is aggregate diffusion. The transition from dominating aggregate diffusion
      to a dominating molecular diffusion is induced by a slight (2 (deg)C) increase in temperature
      and is accompanied by a significant growth in size of the swollen micelles.
CC   SUPPLEMENTAL TECHNOLOGY
SH   *MICROEMULSION
CT   *ADDITIVE; *CYCLOHEXANE; *DIFFUSION; *DIFFUSION COEFFICIENT; *EMULSION;
      *HEXADECANE; *MIXTURE; *PHASE BEHAVIOR; *SURFACE ACTIVE AGENT; ANALYTICAL
      METHOD; CHART; COMPOSITION; COMPOUND; DERIVATIVE (CHEMICAL); DIAGRAM;
      DODECYL ETHER; ETHER; FOURIER TRANSFORM; FUNCTION (MATHEMATICS); GLYCOL
      ETHER; MAGNETIC RESONANCE; MATHEMATICS; MOLECULAR
      STRUCTURE; NMR SPECTROSCOPY; NONIONIC; NUCLEAR MAGNETIC
      RESONANCE; OIL CONTENT; OIL IN WATER EMULSION; PHASE DIAGRAM;
      PHYSICAL PROPERTY; RESONANCE; SPECTRAL ANALYSIS; STRUCTURE; TEMPERATURE;
      TESTING; WATER IN OIL EMULSION
RN   544-76-3 (HEXADECANE)
      4542-57-8 (DODECYL ETHER)
      110-82-7Q, 25012-93-5Q (CYCLOHEXANE)

[handwritten note: 4-30-2004 / NA TAF / No measnt of oil/water / Content / Only that oil/water Are / present]

AN   1988:616498 HCAPLUS Full-text
DN   109:216498
ED   Entered STN: 10 Dec 1988
TI   Microemulsions with nonionic surfactants. 1. Diffusion process of oil
      molecules
AU   Olsson, U.; Nagai, K.; Wennerstroem, H.
CS   Chem. Cent., Univ. Lund, Lund, S-221 00, Swed.
SO   Journal of Physical Chemistry (1988), 92(23), 6675-9
      CODEN: JPCHAX; ISSN: 0022-3654
DT   Journal
LA   English
CC   66-2 (Surface Chemistry and Colloids)
AB   The mol. self-diffusion in a microemulsion system containing 7.0 weight% H2O, and a 1:1 (by
      weight) mixture of cyclohexane and hexadecane was investigated by using Fourier transform
      pulsed-gradient spin-echo 1H NMR. The purpose of the mixing of 2 oils was to reveal
      information concerning the diffusion processes responsible for the observed macroscopic
      transport of oil mols. in microemulsion systems. The study was performed in an isotropic
      solution phase that at a constant surfactant concentration of 7.0 weight% exists over the
      whole range of water-to-oil ratios. For the majority of compns. the dominating diffusion
      process is a mol. diffusion in an oil medium. This process is at low oil content achieved by
      rapid fusion-fission of micellar aggregates, and a significant polydispersity is suggested to
      explain the magnitude of the diffusion coeffs. The present study also distinguishes, at low

temperature and oil content, the presence of closed swollen micelles (O/W microemulsion) where the dominating diffusion process is aggregate diffusion. The transition from dominating aggregate diffusion to a dominating mol. diffusion is induced by a slight (2°) increase in temperature and is accompanied by a significant growth in size of the swollen micelles. At equal volume fractions of H2O and oil a tubular structure can be ruled out by the present data.

MA TAF 4-30-2004

L46 ==

AN   1997-350365 [32]   WPIX Full-text
CR   1995-074218 [10]
DNN   N1997-290432   DNC C1997-113122
TI   Petroleum analyser using microwave energy to derive solid/liquid ratio -
      in which the detected energy is compared to map of attenuated
      amplitude versus phase for a set of reference petroleum
      streams having known solid, oil and water contents.
DC   H01 S03 W06
IN   BROST, D F; MARRELLI, J D; PEPIN, L L; SIDDIOUI, F; STAFFORD, J D
PA   (TEXC) TEXACO INC
CYC   1
PI   **US 5644244   A 19970701 (199732)*   4   G01N022-04**
ADT   US 5644244 A CIP of US 1991-718665 19910621, US 1995-374002 19950118
FDT   US 5644244 A CIP of US 5383353
PRAI US 1995-374002   19950118; US 1991-718665   19910621
IC   ICM G01N022-04
AB   US   5644244 A UPAB: 19970806
      Method for measuring a petroleum stream having an immiscible flow of solids, water and oil,
      comprises: (a) directing an incident beam of microwave energy of 10 - 12 gigahertz frequency
      through the petroleum stream; (b) detecting attenuated microwave energy passing through the
      stream and using the detected reflected energy to measure the relative phase of the incident
      microwave energy and the attenuated microwave energy; and (c) comparing the relative phase and
      amplitude attenuation of the attenuated microwave energy to an empirically derived reference
      map of amplitude attenuation as a function of relative phase shift for a set of reference
      petroleum streams having known, but varied, percentages of solids, oil and water to derive the
      ratio of solids to liquids in the measured petroleum streams.
          USE - Petroleum analyser using microwave energy to derive solid/liquid ratio.
          ADVANTAGE - The detected microwave energy is compared to map of attenuated amplitude vs.
      phase for a set of reference petroleum streams having known solid, oil and water contents, to
      derive the required oil/liquid ratio of the stream. Dwg.1/2
FS   CPI EPI
FA   AB; GI   *Not Law Few NMR   NA TAF 4/30/2004*
MC   CPI: H01-D12
      EPI: S03-E05; S03-E14E1; S03-F06A; W06-A04H8

L46 ==

AN   1982-P8522E [45]   WPIX Full-text
TI   Standard measure for NMR oil seed tests - using paramagnetic
      salt solution and elastomer with suitable mass ratio as models
      for oil and water.
DC   S03
IN   ASPIOTIS, E K H; LAKHOV, V M; VITYUK, B Y A
PA   (ASPI-I) ASPIOTIS E KH
CYC   1
PI   SU 898306   B 19820115 (198245)*   4
PRAI SU 1980-2927283   19800516
IC   G01N024-10
AB   SU   898306 B UPAB: 19930915
      A standard measure for the calibration and check of nuclear magnetic resonance (NMR) analyzers
      of the oilines and moisture of linseed cultures consists of a cylindrical ampoule (1) which
      has an internal cylindrical cavity (2) containing an elastomer (3). The annular cavity (4)
      around it holds an amount of an aqueous solution of a paramagnetic salt (5). A sealant (6,7)
      is used to close the inner and outer cavity.
          The solution (5) is a proton containing subtance with a spin-spin relaxation time
      corresponding to that of the oil protons in the linseed cultures. The elastomer (3) has a
      spin-spin relaxation time corresponding to that of water protons.

The mass ratio of the two substances (3,5) must be such as to simulate the amplitude ratio of the NMR signals from oil and water in the seeds. This reduces the cost and simplifies the technology of preparing such a standard measure. Bul. 2/15.1.82.
    1/1
FS   EPI
FA   AB
MC   EPI: S03-E07

NA TAF 4/30/2004

L46   ===
ANSWER 12 OF 12 AGRICOLA Compiled and distributed by the National
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        of America. It contains copyrighted materials. All rights reserved.
        (2004) on STN
AN   97:45648 AGRICOLA Full-text
DN   IND20573958
TI   Development of a high speed NMR techniques for sensing maturity of
      avocados.
AU   Chen, P.; McCarthy, M.J.; Kim, S.M.; Zion, B.
CS   University of California, Davis, CA.
SO   **Transactions of the ASAE, Nov/Dec 1996. Vol. 39, No. 6. p. 2205-2209**
      Publisher: St. Joseph, Mich. : American Society of Agricultural Engineers
      1958-
      CODEN: TAAEAJ; ISSN: 0001-2351
NTE   avocades
      Includes references
CY   Michigan; United States
DT   Article
FS   U.S. Imprints not USDA, Experiment or Extension
LA   English
AB   This study demonstrates the feasibility of using an NMR technique for high-speed on-line
      sensing of maturity of avocados. Results of our previous studies indicate that it is possible
      to use high-speed, single-pulse NMR techniques to evaluate quality of fruits and vegetables.
      The single-pulse free induction decay (FID) spectrum measurement technique was used
      successfully to evaluate maturity of avocados and sugar content of fresh prunes, and was found
      to have desired features for high-speed sensing of fruit quality. In this study we
      successfully used a specially designed conveyor belt to acquire FID spectra of avocados while
      they were moving at speeds up to 250 mm/s. The oil/water resonance peak ratio, obtained from
      the spectrum, correlates very well (r2 = 0.98) with the dry weight of the fruit.
CC   Q505 Food Composition, Horticultural Crop Products
CT   avocados; food quality; maturity; nondestructive testing; nuclear magnetic
      resonance; sorting conveyors; spectrometry; water content
ST   free induction decay spectra; oil content; water and oil mobility

Not Fluid Emusen Fruits are Solids TAF 4/30/2004

L59   ===
ANSWER 6 OF 12 TULSA COPYRIGHT 2004 UTULSA on STN
AN   2001:4246 TULSA Full-text
DN   746574
TI   **NMR TECHNOLOGY ENHANCES FORMATION EVALUATION, TESTING AND COMPLETION
      DECISIONS IN INDONESIA**
AU   MCDONALD, T; ALY, M; DAVIS, B
CS   SCHLUMBERGER GEOQUEST; SCHLUMBERGER WIRELINE TEST
SO   27TH ANNU INDONES PETROL ASS CONV (JAKARTA, INDONESIA, 2/1-3/2000) PROC V
      2, PP 37-49, 2000 (IPA99-G-130; COLOR; 2 REFS)
DT   Conference; Conference Article
LA   English
AB   Over the last several years, use of borehole NMR measurements have become more commonplace.
      This is due to a better understanding of the measurement by the service and operating
      companies, and new applications that have been developed. In most wells drilled in Indonesia,
      basic evaluation tools will deliver an adequate evaluation. However, there are formations that
      are difficult to evaluate due to any number of issues. NMR measurements provide new
      petrophysical parameters that can help deal with some of these difficulties. Producibility is
      another issue that standard logs do not address very well. This leads to a need for well
      testing, either with wireline formation testers or drill stem tests. NMR measurements can give

NA TAF 4/30/2004

a continuous quantitative indication of rock quality and permeabilty in lieu of these tests. Several case studies from wells in Indonesia are presented where NMR measurements have been used by asset teams to solve difficult evaluation problems.

CC   WELL LOGGING
SH   *NUCLEAR MAGNETIC LOGGING
CT   *FORMATION EVALUATION; *FREE FLUID INDEX; *INTERPRETATION;
     *MAGNETIC RESONANCE; *NUCLEAR LOGGING; *NUCLEAR MAGNETIC RESONANCE;
     *PHYSICAL PROPERTY; *POROSITY; *POROSITY DISTRIBUTION; *RESONANCE; *ROCK
     PROPERTY; *SATURATION; *WATER SATURATION; *WELL LOGGING; ALKALI METAL;
     AMPLITUDE; ANALYTICAL METHOD; ARGILLACEOUS DEPOSIT; ARGILLACEOUS
     METHOD; WATER; WATER (SUBSURFACE); WATER OIL
     RATIO; WATER RESISTIVITY; WAVE AMPLITUDE; WELL LOG
     INTERPRETATION; WELL LOGGING DATA
RN   1333-74-0   (HYDROGEN)
     7439-89-6   (IRON)

NA TAF 4/30/2004